

Orthostatic Hypertension in the Cardiology Department of the University Hospital Gabriel Touré

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Abstract

Introduction: Orthostatic hypertension (OHTN) is an aspect of high blood pressure. It is poorly understood and needs to be targeted.

Objective: To determine the prevalence of OHTN in the cardiology department of the University Hospital Gabriel Touré (UH-GT).

Method: It concerned all outpatients seen in the cardiology department during the study period, consenting to participate in the study and who were also able to last a 5-min stand-up.

Results: Only 1.3% of our patients had systolic OHTN, 20% of patients had a diastolic OHTN from the orthostatism. The sex ratio Male:Female was 1 for systolic OHTN and 0.52 for diastolic OHTN with 65.6%. Males represented about 62.5% of systolic OHTN while females predominated in diastolic OHTN with 59.7%. Also the 50-69 age group predominated with 50 and 44.4% respectively for systolic and diastolic orthostatic hypertension. For the diagnosis, hypertension was widely represented with 83.3% during systolic OH and 58% during diastolic OH. High blood pressure (HBP) was largely represented with 75% during systolic OH and 76.4% during diastolic OH. Calcium inhibitor (CCB) + angiotensin converting enzyme Inhibitor (ACE-I) + and diuretic (D) with 3.3% were the most prescribed drugs during OHTN with $p = 0.024$.

Conclusion: Our study allowed us to affirm that doubt is no longer allowed on the importance of OHTN. Further studies are needed for a better understanding of this phenomenon most often associated with hypertension.

Keywords: O H, HBP, cardiology, Bamako.

INTRODUCTION

Orthostatic Hypertension (OHTN) is an underestimated and poorly studied clinical phenomenon and does not yet have a standard definition, but an operational definition based on previous studies refers to it as an increase in systolic blood pressure of 20 mmHg during the change of position from the supine position to the standing position [1].

Clearly, orthostatic hypertension represents an aspect of hypertension that is poorly understood and needs to be targeted. There are very few studies on the subject in Africa and in Mali no study has yet been done on

this subject. Hence the implementation of this study becomes highly important in regard to what has been said. The purpose of our work is to determine the prevalence of Orthostatic Hypertension.

METHOD

Framework and Place of Study

The study took place in the cardiology department of the Gabriel Touré University Hospital Center.

Type of Study

It was a cross-sectional, analytical and descriptive study.

Study Population

All outpatients in the cardiology department during the study period regardless of gender.

Study Duration

Our study lasted from April 16th to August 30th, 2018.

Ethics

We obtained the verbal consent of the participants.

Inclusion criteria

All consenting patients received for consultation in the cardiology department during the study period and were able to stand.

Criteria of non-inclusion

Any patient received during the study period who did not consent to the study.

Data processing

Data were collected using an access database and SPSS (IBM corp.) software used for data processing and analysis.

Data Collection Method

Blood pressure(BP) and heart rate were measured using a conventional electronic device, on the two arms after a long rest, then the subject stands still for the rest of the BP taking: immediately and at 1 and 3 minutes.

Our Definition of OHTN [2]

We defined OH as an increase in systolic blood pressure (SBP) of 20 mmHg and/or diastolic blood pressure (DBP) of more than 10 mmHg from orthostatism and at 3mn.

RESULTS

Only 1.3% of our patients had a systolic, 20% a diastolic OHTN immediately after standing. At 3 minutes after standing systolic and diastolic OHTN were found in respectively in 1, 8 and 16% of all cases (Diagram 1).

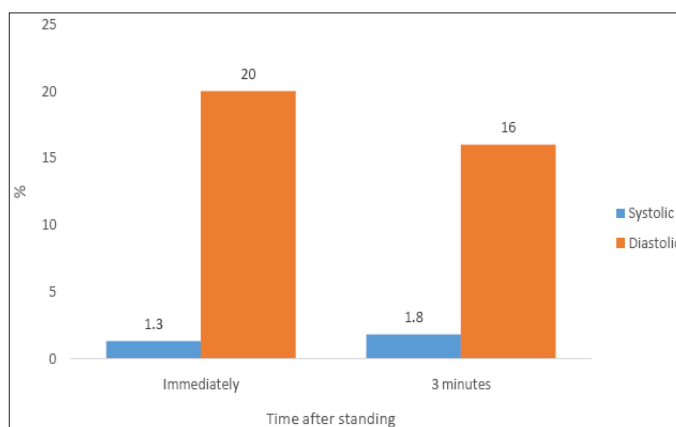


Fig 1. *proportion of patients with orthostatic hypertension immediately and 3 minutes after standing*

Immediately after standing systolic OHTN occurred without difference according to sex and predominantly in age group 50-69 years (50%) whereas diastolic OHTN was found among women (65.6%) and also in age group 50-69 years (41.1%) (Table I).

At 3 minutes systolic OHTN occurred in 62.5% among men and in age group 50-69 years (50%). Diastolic OHTN was found in 59.7% of all cases in women and in age group 50-69 years (44.4%) (Table I).

Table 1. *Epidemiological characteristics of patients with orthostatic hypertension immediately after standing*

Characters		Systolic		Diastolic	
		N	%	N	%
Sex	Male	3	50,0	31	34,4
	Female	3	50,0	59	65,6
Age groups (years)	0 - 29	1	16,7	12	13,3
	30 - 49	1	16,7	32	35,5
	50 - 69	3	50,0	37	41,1
	70 - 89	1	16,7	9	10,0
Diagnosis	Cardiomyopathy	1	16,7	13	14,44
	HBP	5	83,3	58	64,45

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	Associated HBP	0	0	9	10
	Others	0	0	10	11,11
Profession	Householder	0	0	6	6,7
	Civil Servant	2	33,3	43	47,8
	Trader	1	16,7	11	12,2
	Farmer	1	16,7	10	11,1
	Others	2	33,3	20	22,2

For the diagnosis, hypertension was widely represented with 83.3% during systolic OH and 58% during diastolic Blood Pressure. HBP was largely represented with 75% during systolic OH and 76.4% during diastolic OH (Table II).

Table 2. Distribution of the pressure profile immediately after standing according to sex

Sex	OH* N (%)		OHTN N (%)		Normal Profile		Total	
	N	%	N	%	N	%	N	%
Male	17	25,8	3	50,0	134	35,5	154	34,3
Female	49	74,2	3	50,0	243	64,5	295	65,7
Total	66	100	6	100	377	100	449	100

* Orthostatic hypotension

In the series 65.5% of our patients had a diastolic OH from orthostatism against 34.4% of men. This difference was not statistically significant ($p = 0.926$).

More than half of our patients (59.7%) had a diastolic OH at 3 minutes of orthostatism against 40.3% of men ($p = 0.072$).

The majority of male patients (62.5%) had systolic OH within 3 minutes of orthostatism versus 37.5% of

patients. This difference was significant ($p = 0.030$).

The age group 50-69 had the highest prevalence with 35.55% ($p = 0.057$).

Calcium channel blocker (CCB) alone with 2% or in combination (4%) were the most used anti-hypertensive drug. followed by CCB+Angiotensin converting enzyme inhibitor)+diuretic with 3.3% ($p = 0.024$).

Table 3. Distribution of the systolic blood pressure profile immediately after standing to the age group.

Age group (years)	OH* N (%)		OHTN N (%)		Normal Profile		Total	
	N	%	N	%	N	%	N	%
0-29	3	4,5	1	16,7	42	11,1	46	10,2
30-49	21	31,8	1	16,7	124	32,9	146	32,5
50-69	30	45,5	3	50,0	164	43,9	197	43,9
70-89	12	18,2	1	16,7	45	11,9	58	12,9
Total	66	14,7	6	1,3	377	84,0	449	100

* Orthostatic hypotension

Table 4. Distribution of the diastolic blood pressure profile immediately after standing according to the most used anti-hypertension.

	OH* N (%)	OHTN N (%)	Normal	Total
No	2,4	8,2	28,1	38,8
CAH*	0,2	0,4	0,7	1,3
ARB + D	0,0	0,2	1,1	1,3
BB	0,0	0,7	1,8	2,4
CCB	0,7	3,3	11,1	15,1
CCB+BB	0,0	0,2	1,6	1,8
CCB+ICE+D	0,7	3,1	8,2	12,0
ICE+D	0,7	0,9	9,4	10,9
ICE+D+BB	0,2	1,8	4,9	6,9
ARB+D+BB	0,0	0,2	1,1	1,3
ICE	0,4	0,2	0,9	1,6
Others*	0,4	0,7	5,3	6,5

* Orthostatic hypotension* CAH : central antihypertensive

Table 5. *Distribution of the systolic blood pressure immediately after standing according to the pathologies found.*

	OH* N (%)	OHTN N (%)	Normal	Total
Stroke / hypertension	0,2	0,0	0,9	1,1
Cardiomyopathy	1,3	0,2	10,5	12,0
Peripartum cardiomyopathy	0,0	0,0	2,4	2,4
HBP	11,8	1,1	51,4	64,4
HBP + DIABETES	0,4	0,0	0,7	1,1
HBP + Chronic Kidney Disease	0,0	0,0	1,1	1,1
Rheumatic valvular disease	0,0	0,0	2,4	2,4
Others**	0,9	0,0	12,7	13,6

*orthostatic hypotension

**Other: Acute Coronary Syndrome (ACS), Hypertrophic Cardiomyopathy (HCM)

DISCUSSION

It was a transversal, analytical and descriptive study conducted in the cardiology department of the Gabriel Touré University Hospital Center for a period extending from April 16th to August 30th, 2018. The sample consisted of 449 patients aged 12 to 92 years including men and women, all outpatients.

Our study, the first of its kind in Mali, suffered had some limits, notably the lack of data from Mali and Africa, and the lack of follow-up studies for patients over a sufficiently long period to allow the observation of events which can be linked to OHTN. Thus, we did not look for clinical and complementary elements associated with OH which may have a cardiovascular impact, such as a left ventricular hypertrophy.

Prevalence

In our series, the prevalence of systolic OH was 1.3% immediately after standing. This relatively low rate can be explained by the size of the sample in particular. Authors have found somewhat higher proportions in studies of elderly hypertensive subjects in developed countries. Their rate was close to 11% of systolic OH [1].

Regarding the prevalence of diastolic OH from orthostatism, it was 20% in our series. Streeten [2] found a rate below 10% in a study among hypertensive patients. This rate is all the more surprising as the elderly is more common in developed countries under antihypertensive treatment and subject to the various side effects and harmful manifestations of this condition that in Africa generally. This gap between our two proportions could largely be explained by methodological differences.

The prevalence at 3 minutes after standing of systolic OHTN was 1.8%, compared to 16% diastolic OHTN.

Fan [3] also found in his study among hypertensive patients of elderly and middle-aged subjects a rate of 16.3% diastolic OH at 3 minutes after standing. It should be noted that in our series the patients had an age somewhat similar to that of the subjects of this author even if its rate was much higher than ours. It was an Asian population with sometimes clinical characteristics different from those of our patients.

Berkman [4] in a study of OHTN on elderly people, based on the average arterial pressure (A AP) found a prevalence of 39% of OHTN. Safar [5], however, in his study on essential hypertension of the young subject found a prevalence of 25% of OHTN. This difference in the prevalence between authors could be explained by the variability of the values used to define both systolic and diastolic OH, but also by sample differences, especially concerning age and clinical specificities.

Data According to Epidemiological Characteristics

In our study, females were also more common with 65.6% and 9.7% of diastolic OHTN respectively immediately and 3 minutes after standing. This could simply be explained by the high percentage of females in our sample. According to the Framingham study, the incidence of cardiovascular disease is multiplied by 2 with men and by 3 with women.

The age group of 50 to 69 years with 41.1% and 44.3% was the most represented respectively immediately and 3 minutes after standing.

Data According to Different Diagnoses

High Blood Pressure was the most frequently encountered diagnosis as well in systolic as in diastolic OHTN. This finding could be due to the high frequency of HBP in our study and also was consistent with the literature [6] that incriminate both hypertension and diabetes, dysautonomia among others in case of OHTN.

Data According to the Different HBP Treatments

CCB were the most incriminated antihypertensive drug in both immediate orthostatic hyper- and hypotension either alone (3.3%) or in combination (6%) ($p=0.971$). They also represented 2% as single drug or in combination 4% in OTHN at 3 minutes. The responsibility of CCB in OTHN and orthostatic hypotension could be explained by their wide use in the different medical services. However further in-depth studies may follow to further confirm their liability in OTHN.

CONCLUSION

Our study allowed us to affirm that doubt is no longer allowed on the importance of OTHN. We obtained a prevalence of 1.3% of the systolic OTHN immediately after standing against 20% for the diastolic OH. Also we had a prevalence of 1.8% systolic OTHN against 16% diastolic OTHN 3 minutes after standing. However our study being purely epidemiological, other studies with more specific objectives should follow for a better understanding of this phenomenon.

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